

IN THE CLAIMS

1. (Previously Presented) A storage media, comprising:
a plastic substrate having a substrate composition and a substrate thickness;
an optical layer having a layer composition different from the substrate composition;
a data storage layer disposed therebetween; and
a reflective layer disposed between the data storage layer and the substrate;
wherein the storage media has a radial deviation over time of less than or equal to about 1.15 degrees at a radius of 55 mm when exposed to humidity.
2. (Original) The storage media of Claim 1, wherein a stiffness ratio of the optical layer to the substrate is about 0.5 to about 5 measured in tensile deformation at room temperature.
3. (Original) The storage media of Claim 2, wherein the stiffness ratio is about 0.7 to about 3 measured in tensile deformation at room temperature.
4. (Original) The storage media of Claim 3, wherein the stiffness ratio is about 1.25 to about 2.5 measured in tensile deformation at room temperature.
5. (Original) The storage media of Claim 1, wherein a swell ratio of the optical layer to the substrate is about 0.5 to about 5.0.
6. (Original) The storage media of Claim 5, wherein the swell ratio is about 0.75 to about 3.0.
7. (Original) The storage media of Claim 6, wherein the swell ratio is about 1.0 to about 2.5.

8. (Original) The storage media of Claim 1, wherein the optical layer has a layer thickness of greater than or equal to about 20% of the substrate thickness.

9. (Original) The storage media of Claim 8, wherein the layer thickness is about 20% to about 40% of the substrate thickness.

10. (Original) The storage media of Claim 9, wherein the layer thickness is about 25% to about 35% of the substrate thickness.

11. (Original) The storage media of Claim 1, wherein the optical layer has a layer thickness of about 0.2 micrometers to about 0.6 mm.

12. (Original) The storage media of Claim 11, wherein the layer thickness is about 0.2 micrometers to about 120 micrometers.

13. (Original) The storage media of Claim 1, wherein the substrate thickness is about 0.3 mm to about 2.5 mm.

14. (Original) The storage media of Claim 13, wherein the substrate thickness is about 0.6 mm to about 2.0 mm.

15. (Original) The storage media of Claim 14, wherein the substrate thickness is about 1.1 mm to about 1.5 mm.

16. (Original) The storage media of Claim 1, wherein the optical layer has a layer thickness, and a thickness ratio of the layer thickness to the substrate thickness is about 0.001 to less than 1.

17. (Original) The storage media of Claim 16, wherein thickness ratio is about 0.005 to about 0.5.

18. (Original) The storage media of Claim 17, wherein the thickness ratio is about 0.025 to about 0.1.

19. (Original) The storage media of Claim 1, wherein the layer composition and the substrate composition are plastics individually selected from the group consisting of thermoplastics, thermosets, and homopolymers, copolymers, reaction products, and combinations comprising at least one of the foregoing plastics.

20. (Original) The storage media of Claim 19, wherein the thermoplastics are selected from the group consisting of polyethylene, polypropylene, copolymers of polyethylene and polypropylene, chlorinated polyethylene, polyvinyl chloride, polymethylpentane; ethylene-tetrafluoroethylene copolymers, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, polytetrafluoroethylene, ethylene-vinyl acetate copolymers, polyvinyl acetate, diene-derived polymers and copolymers, polybutadiene, polyisoprene, polymers of ethylenically unsaturated carboxylic acids, functional derivatives of polymers containing ethylenically unsaturated carboxylic acids, acrylic polymers, poly(alkyl acrylates), poly(alkyl methacrylates), polyacrylamides, polyacrylonitrile, polyacrylic acid, alkenylaromatic polymers, polystyrene, poly-alpha-methylstyrene, hydrogenated polystyrenes, syndiotactic and atactic polystyrenes, polycyclohexyl ethylene, styrene-co-acrylonitrile, styrene-co-maleic anhydride, polyvinyltoluene, rubber-modified polystyrenes; polyamides, nylon-6, nylon-66, nylon-11, and nylon-12, polyacetals, polyesters, polyethylene terephthalate, polybutylene terephthalate, polycyclohexylmethyleneterephthalate, polycarbonates, polyester carbonates, high heat polycarbonates, polyethers, polyarylene ethers, polyphenylene ethers derived from 2,6-dimethylphenol and copolymers with 2,3,6-trimethylphenol, polyethersulfones, polyetherethersulfones, polyetherketones, polyetheretherketones, and polyetherimides, polyarylene sulfides, polysulfones, and polysulfidesulfones, liquid crystalline polymers and homopolymers, copolymers, reaction products, combinations and composites comprising at least one of the foregoing thermoplastics, and wherein the thermosetting resins are selected from the group consisting of epoxies, phenolics, alkyds, polyesters, polyimides, polyurethanes, mineral filled silicones, bis-maleimides, cyanate esters, multifunctional allylic compounds, acrylics, alkyds, phenol-formaldehyde, novolacs, resoles, bismaleimides, melamine-formaldehyde, urea-formaldehyde, benzocyclobutanes, hydroxymethylfurans, isocyanates, benzocyclobutene resins, and homopolymers, copolymers, reaction products, and combinations comprising at least one of the foregoing thermosetting resins.

21. (Original) The storage media of Claim 1, wherein the radial deviation is less than or equal to about 1.0 degrees.

22. (Original) The storage media of Claim 21, wherein the radial deviation is less than or equal to about 0.7 degrees.

23. (Original) The storage media of Claim 22, wherein the radial deviation is less than or equal to about 0.5 degrees.

24. (Original) The storage media of Claim 23, wherein the radial deviation is less than or equal to about 0.25 degrees.

25. (Previously Presented) A storage media comprising:
a plastic substrate having a substrate composition and a substrate thickness;
an optical layer having a layer composition and a layer thickness, wherein the layer thickness differs from the substrate thickness and the layer composition differs from the substrate composition;
a data storage layer disposed therebetween; and
a reflective layer disposed between the data storage layer and the substrate;
wherein the storage media has a radial deviation over time of less than or equal to about 1.15 degrees at a radius of 55 mm when exposed to humidity.

26. (Original) The storage media of Claim 25, wherein a stiffness ratio of the optical layer to the substrate is about 0.5 to about 5 measured in tensile deformation at room temperature.

27. (Original) The storage media of Claim 26, wherein the stiffness ratio is about 0.7 to about 3 measured in tensile deformation at room temperature.

28. (Original) The storage media of Claim 27, wherein the stiffness ratio is about 1.25 to about 2.5 measured in tensile deformation at room temperature.

29. (Original) The storage media of Claim 25, wherein a swell ratio of the optical layer to the substrate is about 0.5 to about 5.0.

30. (Original) The storage media of Claim 29, wherein the swell ratio is about 0.75 to about 3.0.

31. (Original) The storage media of Claim 30, wherein the swell ratio is about 1.0 to about 2.5.

32. (Original) The storage media of Claim 25, wherein the layer thickness is greater than or equal to about 20% of the substrate thickness.

33. (Original) The storage media of Claim 32, wherein the layer thickness is about 20% to about 40% of the substrate thickness.

34. (Original) The storage media of Claim 33, wherein the layer thickness is about 25% to about 35% of the substrate thickness.

35. (Original) The storage media of Claim 34, wherein the layer composition and the substrate composition are plastics individually selected from the group consisting of thermoplastics, thermosets, and homopolymers, copolymers, reaction products, and combinations comprising at least one of the foregoing plastics.

36. (Original) The storage media of Claim 25, wherein the radial deviation is less than or equal to about 1.0 degrees.

37. (Original) The storage media of Claim 36, wherein the radial deviation is less than or equal to about 0.7 degrees.

38. (Original) The storage media of Claim 37, wherein the radial deviation is less than or equal to about 0.5 degrees.

39. (Original) The storage media of Claim 38, wherein the radial deviation is less than or equal to about 0.25 degrees.

40. (Previously Presented) A storage media, comprising:
a plastic substrate having a substrate composition and a substrate thickness;
an optical layer having a layer composition different from the substrate composition;
a data storage layer disposed therebetween; and
a reflective layer disposed between the data storage layer and the substrate;
wherein the storage media has a radial deviation over time of less than or equal to about 1.15 degrees at a radius of 55 mm when exposed to humidity, a stiffness ratio of the optical layer to the substrate is about 0.5 to about 5 measured in tensile deformation at room temperature, a swell ratio of the optical layer to the substrate is about 0.5 to about 5.0.

41. (Original) The storage media of Claim 40, wherein the stiffness ratio is about 0.7 to about 3 measured in tensile deformation at room temperature.

42. (Original) The storage media of Claim 41, wherein the stiffness ratio is about 1.25 to about 2.5 measured in tensile deformation at room temperature.

43. (Original) The storage media of Claim 40, wherein the swell ratio is about 0.75 to about 3.0.

44. (Original) The storage media of Claim 43, wherein the swell ratio is about 1.0 to about 2.5.

45. (Previously Presented) The storage media of Claim 1, wherein the substrate comprises a thermoset and the optical layer comprises a thermoplastic.

46. (Previously Presented) The storage media of Claim 1, wherein the radial deviation over time of less than or equal to about 1.15 degrees at a radius of 55 mm, when exposed to a cycle at 25°C of 50% relative humidity – 90% relative humidity – 50% relative humidity.

47. (Previously Presented) The storage media of Claim 25, wherein the substrate comprises a thermoset and the optical layer comprises a thermoplastic.

48. (Previously Presented) The storage media of Claim 25, wherein the radial deviation over time of less than or equal to about 1.15 degrees at a radius of 55 mm, when exposed to a cycle at 25°C of 50% relative humidity – 90% relative humidity – 50% relative humidity.

49. (Previously Presented) The storage media of Claim 40, wherein the substrate comprises a thermoset and the optical layer comprises a thermoplastic.

50. (Previously Presented) The storage media of Claim 40, wherein the radial deviation over time of less than or equal to about 1.15 degrees at a radius of 55 mm, when exposed to a cycle at 25°C of 50% relative humidity – 90% relative humidity – 50% relative humidity.

51. (Previously Presented) The storage media of Claim 20, wherein the layer composition and the substrate composition are, individually, selected from the group consisting of polycarbonate, polyarylene ether, polystyrene, poly(alkyl acrylate), and copolymers and combinations comprising at least one of the foregoing.

52. (Previously Presented) The storage media of Claim 1, wherein at least one of the layer composition and the substrate composition comprise residues of 1,1-bis(4-hydroxy-3-methylphenyl)cyclohexane.

53. (Previously Presented) A storage media, comprising:
a plastic substrate having a substrate composition comprising a polyarylene ether and having a substrate thickness;
an optical layer having an optical layer composition different from the substrate composition;
a reflective layer disposed between the optical layer and the substrate;
wherein the storage media has a radial deviation over time of less than or equal to 1.15 degrees at a radius of 55 mm when exposed to a cycle at 25°C of 50% relative humidity – 90% relative humidity – 50% relative humidity, and wherein the storage media is capable of storing greater than or equal to about 20 GB of data.

54. (Previously Presented) The storage media of Claim 53, wherein the substrate has a side comprising surface features, and wherein the reflective layer is disposed on the side of the substrate comprising the surface features.

55. (Previously Presented) The storage media of Claim 53, further comprising a data storage layer disposed between the reflective layer and the optical layer, wherein the data storage layer comprises a material selected from the group consisting of an organic dye and an inorganic phase change compound.

56. (Previously Presented) The storage media of Claim 53, wherein a stiffness ratio of the optical layer to the substrate is about 0.5 to about 5 measured in tensile deformation at room temperature.

57. (Previously Presented) The storage media of Claim 53, wherein a swell ratio of the optical layer to the substrate is about 0.5 to about 5.0.

58. (Previously Presented) The storage media of Claim 53, wherein the optical layer thickness is about 0.2 micrometers to about 120 micrometers.

59. (Previously Presented) The storage media of Claim 53, wherein the optical layer composition is selected from the group consisting of polycarbonates, acrylic polymers, epoxies, silicones, and copolymers and combinations comprising at least one of the foregoing optical layer compositions.

60. (Previously Presented) The storage media of Claim 59, wherein the optical layer composition comprises poly(alkyl acrylate).

61. (Previously Presented) The storage media of Claim 59, wherein the optical layer composition comprises silicones.

62. (Previously Presented) The storage media of Claim 53, wherein the substrate composition further comprises polystyrene.

63. (Previously Presented) The storage media of Claim 62, wherein the polyarylene ether comprises a polyphenylene ether selected from the group consisting of polyphenylene ether derived from 2,6-dimethylphenol, polyphenylene ether derived from 2,6-dimethylphenol copolymerized with 2,3,6-trimethylphenol, and reaction products, combinations, and composites comprising at least one of the foregoing polyphenylene ethers.

64. (Previously Presented) The storage media of Claim 53, wherein the radial deviation is less than or equal to about 1.0 degree.

65. (Previously Presented) The storage media of Claim 64, wherein the radial deviation is less than or equal to about 0.5 degrees.

66. (Previously Presented) The storage media of Claim 53, further comprising a dielectric layer disposed between the optical layer and the substrate, wherein the dielectric layer is selected from the group consisting of silicon nitride, aluminum nitride, aluminum oxide, silicon carbide, and combinations comprising at least one of the foregoing dielectric layers.

67. (Previously Presented) The storage media of Claim 53, further comprising an adhesive layer disposed between the optical layer and the substrate, wherein the adhesive layer is selected from the group consisting of polyisoprene, styrene butadiene rubber, ethylene propylene rubber, fluoro vinyl methyl siloxane, chlorinated isobutene-isoprene, chloroprene, chlorinated polyethylene, chlorosulfonated polyethylene, butyl acrylate, expanded polystyrene, expanded polyethylene, expanded polypropylene, foamed polyurethane, plasticized polyvinyl chloride, dimethyl silicone polymers, methyl vinyl silicone, polyvinyl acetate, and combinations comprising at least one of the foregoing adhesives.

68. (Previously Presented) The storage media of Claim 53, further comprising an adhesive layer disposed between the optical layer and the substrate, wherein the adhesive layer is selected from the group consisting of a UV curable adhesive, a pressure sensitive adhesive, and combinations comprising at least one of the foregoing.

69. (Previously Presented) The storage media of Claim 53, further comprising a lubrication layer, wherein the lubrication layer is selected from the group consisting of fluoro oils, and fluoro greases, and combinations comprising at least one of the foregoing.

70. (Previously Presented) The storage media of Claim 53, wherein the optical layer composition is selected from the group consisting of ethylene-tetrafluoroethylene copolymers, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, and polytetrafluoroethylene, and reaction products, and combinations comprising at least one of the foregoing optical layer compositions.

71. (Previously Presented) A storage media, comprising:
a plastic substrate having a substrate composition comprising a polyarylene ether and having a substrate thickness;
an optical layer having an optical layer composition different from the substrate composition; and
wherein the storage media has a radial deviation over time of less than or equal to about 1.15 degrees at a radius of 55 mm when exposed to humidity, a stiffness ratio of the optical layer to the substrate of about 0.5 to about 5 measured in tensile deformation at room temperature, a swell ratio of the optical layer to the substrate of about 0.5 to about 5.0; and
wherein the storage media is capable of storing greater than or equal to about 20 GB of data; and
wherein the storage media is capable of reflecting an energy field.

72. (Previously Presented) The storage media of Claim 71, further comprising a reflective layer disposed between the optical layer and the substrate, and wherein the substrate has a side comprising surface features, and wherein the reflective layer is disposed on the side of the substrate comprising the surface features.

73. (Previously Presented) The storage media of Claim 71, wherein a stiffness ratio of the optical layer to the substrate is about 0.5 to about 5 measured in tensile deformation at room temperature.

74. (Previously Presented) The storage media of Claim 71, wherein a swell ratio of the optical layer to the substrate is about 0.5 to about 5.0.

75. (Previously Presented) The storage media of Claim 71, wherein the optical layer thickness is about 0.2 micrometers to about 120 micrometers.

76. (Previously Presented) The storage media of Claim 71, wherein the optical layer composition is selected from the group consisting of polycarbonates, acrylic polymers, epoxies, silicones, and copolymers and combinations comprising at least one of the foregoing optical layer compositions.

77. (Previously Presented) The storage media of Claim 71, wherein the optical layer composition comprises poly(alkyl acrylate).

78. (Previously Presented) The storage media of Claim 71, wherein the optical layer composition comprises silicones.

79. (Previously Presented) The storage media of Claim 71, wherein the substrate composition further comprises polystyrene.

80. (Previously Presented) The storage media of Claim 71, wherein the polyarylene ether comprises a polyphenylene ether selected from the group consisting of polyphenylene ether derived from 2,6-dimethylphenol, polyphenylene ether derived from 2,6-dimethylphenol copolymerized with 2,3,6-trimethylphenol, and reaction products, combinations, and composites comprising at least one of the foregoing polyphenylene ethers.

81. (Previously Presented) The storage media of Claim 71, wherein the radial deviation is less than or equal to about 1.0 degree.

82. (Previously Presented) The storage media of Claim 81, wherein the radial deviation is less than or equal to about 0.5 degrees.

83. (Previously Presented) The storage media of Claim 71, wherein the optical layer composition is selected from the group consisting of ethylene-tetrafluoroethylene copolymers, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, and polytetrafluoroethylene, and reaction products, and combinations comprising at least one of the foregoing optical layer compositions.